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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/078,047	02/08/2002	Carlos Gamero S.	1.107.01	6353

7590 10/03/2003

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EXAMINER	
CAPUTO, LISA M	

ART UNIT	PAPER NUMBER
2876	

DATE MAILED: 10/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/078,047	GAMERO S., CARLOS
	Examin r	**Art Unit**
	Lisa M Caputo	2876

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-41 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-41 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .

4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: .

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities:

Regarding page 8, line 20: Remove the words "is 4" between "Figure 4" and "is a".

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-41 are rejected under 35 U.S.C. 102(b) as being anticipated by Chmielewski, Jr. et al. (U.S. Patent No. 6,005,704, from hereinafter "Chmielewski").

Chmielewski teaches a cable driven image steering and focusing device having all of the elements and means as recited in claims 1-41 of the instant application.

Regarding claims 1 and 27, Chmielewski teaches a photo identification collection assembly comprising a base portion (base 30) which includes a stage (rotatable platform 31 including a pan/tilt mirror 34), a support member to engage the base structure (arms 32 and 33), a first image collector disposed in engaging relation with the support member (narrow field of view (NFOV) camera 48), a second image collector disposed in engaging relation with the support member (wide field of view (WFOV) camera 50), a third image collector disposed in engaging relation with the support

member (wide field of view (WFOV) camera 50, as recited in claims 10, 17, and 26-27 of the instant application), (there are two WFOV cameras), an image actuator (the pan and tilt axes are used to position the pan/tilt mirror 34 so that the correct narrow field is imaged onto the sensing array of camera 48, as also recited in claims 12-15, 18, and 34-39 of the instant application), and a data storage unit (the image processor 92 contains a memory and the iris image processor 94 contains a microprocessor and associated memory to store video images).

Chmielewski discloses that the present preferred embodiment of our cable driven image steering and focusing device is shown in FIGS. 3, 4, 5 and 6. In this embodiment, a rotatable platform 31 is carried on base 30 which is held on a generally rectangular housing 28. A pan/tilt mirror 34 is glued or clamped onto a mirror frame 35 that is pivotably attached between arms 32 and 33 so the mirror and frame can rotate around tilt axis B shown in chainline in FIG. 5. Arms 32 and 33 are attached to platform 31 (support members are attached to the base portion in an outwardly extending relation where the support extends from the stage as recited in claims 2-3 and 28). An axle 36 extends from the mirror frame 35 through arm 32 and split pulley 38. A second axle extends from the mirror frame 35 and through arm 33. Two angular contact bearings 26 mounted within arms 32 and 33 support the mirror and allow rotation. A stepper motor 40 is positioned below the rotatable platform and has an output shaft 37 that is coincident with the pan axis A in order to minimize inertia reflected on the pan motor. A cable 42' runs from the stepper motor 40 to a gear reduction pulley 41. Cable 42 runs from pulley 41 around two idler pulleys 27 and then around the pulley 38. The pulley 38

is clamped to the axle 36 and when turned by the motor rotates the mirror. We prefer to provide two optical sensors 44 on the platform behind the mirror and flags on the mirror to identify the clockwise and counterclockwise limits and home position. The optical sensors signal the control electronics when the pan/tilt mirror has rotated through a preset position such as 15 degrees from a position parallel to arms 32 and 33. These sensors also provide a means to calibrate the position of the pan/tilt mirror with respect to a coordinate frame associated with the motor. The pan/tilt mirror is carried on rotatable platform 31 which rotates on a bearing 39. We prefer to provide a four point contact bearing 39 to achieve stiffness and minimum bearing height. Rotatable platform 31 is semi-circular in shape having a curved portion 53 and a flat edge 54 This cable 56 runs between stepper motor 58 and idler pulley 59 while pressing against the curved portion 53 of the rotatable platform. Consequently, movement of the cable 56 will turn the platform 31. The idler pulley is carried on an adjustable cam 60 which allows the idler pulley 59 to be moved toward or away from the stepper motor 58. This allows preloading of the cable to increase stiffness and eliminate lost motion. Two optical sensors 64 and 65 are provided near the rotatable platform to sense flags 57 on the platform. In this way the clockwise and counterclockwise limits and home position are identified. In addition, bumpers 66 can be provided to prevent over rotation in either direction. In the present preferred embodiment the axes are oriented tilt over pan. The mirror is nodally mounted. Each axis is driven via a stepper motor and cable drive. There are two cables per each of both reduction stages wrapped in opposite directions on the drive pulley and fixed to opposite ends of split pulley for the tilt stage and with

one wrap over an eccentric idler for the pan stage. The split pulleys and eccentric idler allow both sides of the cable to be preloaded, increasing the system stiffness and virtually eliminating lost motion. Use of the cable also produces a nearly ideal mechanism in that the drive link is virtually massless. As this link connects the load, i.e. mirror, to the drive motors, there is significant attenuation of the primary vibration sources. This feature supports the need for short settling times. The cables preferably are Spectra 2000, 0.012 inch diameter cable. This material possesses high tensile strength which allows it to be wrapped on a pulley diameter much smaller than could be tolerated by a steel cable. Additionally, the cable is highly resistant to abrasion and has a low coefficient of thermal expansion.

Referring to FIG. 4, when this device is used, the pan/tilt mirror 34 is positioned to receive a reflected light beam from the person or object to be identified. The light beam is reflected from pan/tilt mirror 34 to directing mirrors 45 and 46 through the lens assembly 47 to a narrow field of view (NFOV) camera 48 that extends below the level of the lens assembly 47. A motor 49 is provided to precisely control focus. We may optionally include a magnifying lens as well as a primary lens 36 within the lens assembly. We prefer to provide light sources 62 on opposite sides of the mirror and two wide field of view (WFOV) cameras 50 on one side of the housing 28. Other orientations for the light sources and cameras may be used. The light source may emit any selected band of light frequencies including visible light, infrared light or both visible light and infrared light. The light source preferably is a light emitting diode that emits infrared light. A lens and diffuser (not shown) are typically used to guarantee uniform illumination

from the LED. We have found infrared light to be particularly useful because it penetrates eyeglasses and sunglasses more easily than visible light or colored light within the visible spectrum. Infrared light is also invisible to the user and extremely unobtrusive. Optical filters may be placed in the light path in front of the camera or the lens assembly to reduce any undesirable ambient light wavelengths that corrupt the desired images. If desired, the LED light source could be strobed. Strobing provides the capability to freeze motion. Our device has three degrees of freedom, the pan axis, the tilt axis and the focus axis. The pan and tilt axes are used to position the pan/tilt mirror 34 so that the correct narrow field is imaged onto the sensing array of camera 48. The focus axis allows the lens to be moved so that the imaged object is in focus (as recited in claims 6-9 and 29-32).

We prefer to provide computer control using two wide field of view cameras. The cameras supply images to a computer processing unit which then processes them. Commands are sent from the CPU to the motors to change the location of the pan/tilt axes or to adjust focus. This system, shown in FIG. 3, contains the basic optical platform of the first embodiment plus one or two wide field of view (WFOV) fixed focus, fixed location cameras 50 with associated LED assemblies 62. Each LED assembly consists of an infrared LED assembly (such as OPTO DIODE's OD669) and a beam forming lens. The beam forming lens is coated to optimally pass IR light at a wavelength of 880 nanometers. The lenses are angled in such a way as to evenly illuminate a wide field with IR. This field is slightly longer than that imaged by the wide field of view cameras. Camera 48 is a narrow field of view (NOFV) camera having a field of view

which overlaps a subset of the field of view seen by the fixed position/focus WFOV cameras 50 (as recited in claims 4-5 and 27). In the context of iris identification, the optical system 30 and cameras are required to perform under computer control. The directives for positioning the pan/tilt mirror via control of the pan axis, tilt axis and focus axis location will be generated based on processing information from the WFOV cameras 50. The WFOV cameras could utilize a number of techniques such as stereo, stereo with structured light, and depth from focus via structured light to determine both the x-y location and distance to the object of interest. For iris identification that location is either the left or right eye. Given a scene in the wide field of view, a set of coordinates [x, y, z] with respect to the WFOV coordinate system can be determined. These coordinates can then be passed to a controller in order to generate the correct axis commands to position the pan and tilt and focus axes. A calibration procedure must be used to correlate the center of the NFOV camera's field of view with pan/tilt and focus axis positions for a series of coordinates in 3 dimensional space as defined by the wide field of view. Given a set of WFOV coordinates [x,y,z] defining the position of a user's eye somewhere in the working volume in front of the cameras, a transformation or table look up can be used to define the coordinates of the pan, tilt and focus [p,t,f] axes that make the center of the NFOV camera's field of view coincident with x,y coordinates and in focus on the z plane. In the simplest case, one may consider that a WFOV image is acquired, the data is processed and then passed to the controller. In order to minimize motion time and control settling time, all three axes can perform simultaneous motion, that is they start and stop simultaneously.

The block diagram of FIG. 9 illustrates how our compact image steering and focusing device can be used under computer control for iris identification of the user of an automated teller machine. Box 90 represents the embodiment shown in FIGS. 3, 4, 5 and 6 and is generally identified as the optical platform. That embodiment contains NFOV camera 48 and two WFOV cameras 50. Images from the WFOV are transmitted as analog signals to WFOV subsystem image processor 92. The image processor preferably contains two pyramid processors, a memory capable of storing at least two frames, one LUT, ALV device, a digitizer which digitizes the analog video signal, a Texas Instrument TMS 320 C-31 or C-32 processor and a serial/parallel processor. The image is processed using the pyramid processors as described in U.S. Pat. No. 5,359,574 to van der Wal. The Texas Instruments processor computes disparities between images. The WFOV images defines a region or point in the field of view of the WFOV cameras where the subject's right eye or left eye are located. Using stereo processing techniques on the disparities will result in x,y,z coordinates for points on the subject relative to the WFOV cameras. That information is then further processed to define an area of interest such as an eye. The coordinates of the area of interest are used to direct the NFOV optical system. These position coordinates are transferred from the image processor to a NFOV image and iris image processor 94 (data transferred via a network connection as recited in claims 16, 25, and 40 of the instant application). This unit 94 contains a microprocessor and associated memory (as recited in claims 19-24 of the instant application). In the memory are programs and algorithms for directing the optical platform and doing iris identification. Additionally, WFOV video images can be

stored as a security video record as indicated by the Security Video arrow. Output from the NFOV image processor is sent to the NFOV subsystem 96 which contains controllers for the motors and the LED's in the optical platform. The NFOV subsystem then activates the motors in the optical platform to adjust the pan/tilt mirror and lens to focus the NFOV camera and illuminator on that region or point. Images from the NFOV camera are directed through the NFOV subsystem to the NFOV Image Processor 94. That video is digitized and used for iris identification. The image processor could also use the WFOV images for stereo processing to obtain subject position coordinates or for eye tracking(see Figures 3-6, col 2 line 30 to col 10 line 6).

Regarding claims 11, 33, and 41, Chmielewski teaches that the focus axis is used to adjust the position of the lens with respect to the camera's array so that the field of view that is projected on the camera array is in proper focus. In the embodiment that is described, a multiple element lens is used for forming the image on the array. The distance between the back of the lens and camera's imaging element, such as a charge coupled device or CCD, is adjusted to provide focus. This mutiple lens acts as a single fixed focal length lens. It is also possible to have a mechanically coupled set of lenses (typically two) so that a telephoto lens is implemented. For this case, the single linear motion will control both the distance between lenses and the relative location of the lens closest to the array. This can further be extended to include a motor controlling the linear position of each lens with the coupled motion under software control. Furthermore, the lens arrangement could be a telecentric design, vanifocal, or another arrangement that maintains a constant magnification and focus on the NFOV camera's

sensing array independent of the location of the image under consideration (see col 6, lines 29-48). Hence, Chmielweski teaches that at least one of the image collectors is focusing on an area outside the stage areas because the telephoto lens will show the bigger picture of the area in question that will be focused on.

Conclusion

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ***Lisa M. Caputo*** whose telephone number is **(703) 308-8505**. The examiner can normally be reached between the hours of 8:30AM to 5:00PM Monday through Friday. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael G. Lee can be reached on 703-305-3503. The fax phone number for this Group is (703)308-7722, (703)308-7724, or (703)308-7382.

Communications via Internet e-mail regarding this application, other than those under 35 U.S.C. 132 or which otherwise require a signature, may be used by the applicant and should be addressed to [**lisa.caputo@uspto.gov**].

All Internet e-mail communications will be made of record in the application file. PTO employees do not engage in Internet communications where there exists a possibility that sensitive information could be identified or exchanged unless the record includes a properly signed express waiver of the confidentiality requirements of 35 U.S.C. 122. This is more clearly set forth in the Interim Internet Usage Policy published in the Official Gazette of the Patent and Trademark on February 25, 1997 at 1195 OG 89.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956.

LMC
September 12, 2003

MICHAEL G. LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800